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HANDBOOK ON SANITATION OF AIRLINES, 1964 REVISION. STANDARDS OF SANITATION FOR THE CONSTRUCTION AND OPERATION OF COMMERCIAL PASSENGER AIRCRAFT AND SERVICING AND CATERING FACILITIES

Public Health Service
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Airlines

1964 REVISION

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

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AIRLINES

1964 REVISION

STANDARDS OF SANITATION
FOR THE CONSTRUCTION AND
OPERATION OF COMMERCIAL
PASSENGER AIRCRAFT AND
SERVICING AND CATERING
FACILITIES

Details of illustrations in
this document may be better
studied on microfiche.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Environmental Engineering and Food Protection
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I

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II

FOREWORD

The airline industry has grown so large in recent years that an obvious need now exists to set forth, in published form, principles of sanitation (or sanitation standards) which all airlines can follow in order to prevent the spread of preventable, communicable diseases across State lines.

It is recognized generally that sound sanitation practices are an important factor in good service, and furthermore, that healthful, safe, and enjoyable travel is a product of good service and the proper installation and use of equipment. As a matter of practicality, it is better to "build in" facilities which will permit the practice of sound sanitation principles than to make costly changes later.

Food may be harmful to the consumer unless it is clean, wholesome, free from spoilage, and properly prepared and served. Sanitation at catering points and aboard aircraft, as in other eating places, is of considerable public-health importance. Numerous outbreaks of food-borne disease have occurred, many of which could have been prevented by maintenance of recognized standards of sanitation. Water which comes from unsafe sources, or which is improperly handled, can cause serious disease outbreaks. Also important to the airline industry is the sanitary disposal of various kinds of waste matter.

This publication is intended *as a guide* to designers, builders, and operators of aircraft, airline servicing equipment, and facilities. It is intended, also, for use by health department representatives and others who make periodic investigations or inspections of such facilities and operations.

The principles of sanitation pertaining to the preparation, handling, and storage of food (in the section on Catering-Point Sanitation) are adapted from the "*Food Service Sanitation Manual*," Public Health Service Publication No. 934.

Public Law 410, Seventy-eighth Congress, authorizes the Public Health Service to prepare regulations for the prevention of the transmission or spread of communicable disease. Section 361 (a) of that law reads as follows:

> The Surgeon General, with the approval of the Administrator,[1] is authorized to make and enforce such regulations as in his judgment are necessary to prevent the introduction, transmission, or spread of com-

[1] On April 11, 1953, the Federal Security Agency was redesignated the Department of Health, Education, and Welfare, and the Federal Security Administrator became the Secretary of Health, Education, and Welfare.

> municable diseases from foreign countries into the States or possessions, or from one State or possession into any other State or possession. For purposes of carrying out and enforcing such regulations, the Surgeon General may provide for such inspection, fumigation, disinfection, sanitation, pest extermination, destruction of animals or articles found to be so infected or contaminated as to be sources of dangerous infection to human beings, and other measures, as in his judgment may be necessary.

While the standards which appear on the following pages do not have the legal force of Public Health Service regulations, they were written specifically to conform to the intent of applicable regulations. Compliance with these standards, therefore, will insure compliance with the regulations. In the event of noncompliance with a standard and failure to correct the insanitary condition, final corrective action will be based upon the applicability of the regulations concerned.

Insofar as airline sanitation is concerned, this publication supersedes the *Sanitation Manual for Land and Air Conveyances Operating in Interstate Traffic* (Reprint No. 2444 of *Public Health Reports*, January 29, 1943).

These principles are intended to apply primarily to future design and construction, as well as to major alterations to existing facilities. However, where a serious hazard to health occurs in existing facilities, it will be necessary to comply with these standards in order to eliminate it.

This handbook was prepared by the Interstate Carrier Branch of the Division of Environmental Engineering and Food Protection, Public Health Service in collaboration with airline and catering representatives of The Joint Committee on Airline Sanitation of the Air Transport Association of America. The manuscript has been reviewed, also, by representatives of airlines not associated with the A. T. A. The Public Health Service expresses appreciation for the valuable contribution of the airline industry, which resulted in a more practical handbook than might otherwise have been possible.

Undoubtedly, improved methods and equipment will be developed from time to time. These, in turn, will lead to changes in existing requirements for sanitary practices and procedures. Such developments will be included in supplements to or revisions of this handbook, as circumstances may require.

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CONSTRUCTION PLANS

The Public Health Service should be consulted for information as to requirements for conformance with the regulations and policies governing plan review. This applies both to new construction and major improvements, in which items of public health significance are involved, at airport terminals as well as on aircraft. This procedure will prevent costly changes after construction.

Where approval by a State or local health department is required, the Public Health Service can make the necessary arrangements for the submittal of the plans for approval.

The types of plans and specifications of public-health significance, which should be submitted to the Public Health Service for review prior to construction, including the following:

1. **TERMINAL FACILITIES.** *a.* Water-distribution systems at facility (and, when no previous public health approval has been given, the source and treatment of the water supply).

b. Sewerage systems at facility (and, when no previous public health approval has been given, the systems for collection, treatment, and disposal of the sewage).

c. Catering-point facilities, including layout, plumbing, and significant equipment.

d. Plane-servicing equipment, such as water carts, waste carts, and food-carrying equipment.

e. Garbage and other waste-disposal systems, including facilities for cleaning cans or containers.

f. Toilets and lavatories for employees.

2. **AIRCRAFT FACILITIES.** *a.* Water tanks and distribution systems.

b. Buffet area, buffets, and equipment.

c. Toilets and lavatories, including waste-retention tanks.

AIRCRAFT POTABLE-WATER SYSTEMS

1. **APPROVAL.** Public Health Service approval of aircraft potable-water systems, as other sanitation facilities and equipment aboard conveyances, shall be obtained by the airline or by the aircraft manufacturer. This is to be accomplished by plan reviews and/or scheduled inspections during the time of construction or reconstruction.

The following is quoted from section 72.147 of the Interstate Quarantine Regulations:

> Plans for the construction or major reconstruction of sanitary equipment or facilities for such conveyances shall be submitted to the Surgeon General for review of the conformity of such plans with the requirements of this subpart, except that submittal of plans shall not be required for any conveyance under reconstruction if the owner or operator thereof has made arrangements satisfactory to the Surgeon General for inspections of such conveyances while under reconstruction for the purpose of determining conformity with those requirements.

Plans (including complete specifications, where available, and drawings) for the construction or reconstruction of potable water systems should be submitted to the Public Health Service for review. However, in cases where plans are not normally prepared for reconstruction work, arrangements should be made with a representative of the Public Health Service to discuss changes before reconstruction begins and to make inspections during and on completion of reconstruction in lieu of plan submittal.

Although the carrier is responsible for submitting plans, he may request the builder to submit them. Plans should be sent to the appropriate Public Health Service Regional Office. In the case of plan submittal directly by builders, the appropriate Regional Office is the one serving the area in which the builder is located. For plan review purposes, two sets of plans will be submitted. One will be retained by the Regional Office and the other returned to the builder with approval or comment.

2. FILLING INLET. The water-servicing panel on the skin of the aircraft shall be located so as to minimize the possibility of contaminating the water during the filling operation. It should be clearly labeled "Potable Water Filling" and shall be protected from dirt, oil, and other contaminants on the skin of the ship. The panel should be well removed, preferably forward of or on the opposite side of the ship, from sewage and other servicing panels. Water-filling connections should be quick-coupling, of a size or type different from other service connections on the aircraft, and they should permit a direct and tight connection with a water hose fitting. The potable water hose filling connection shall not exceed ¾ inch in diameter. The entire panel should be protected by a hinged cover which locks in place.

The fill line should be completely independent and not cross-connected with any line used for nonpotable liquids.

The tank-overflow and water-system drain lines may also terminate within the water-servicing panel.

3. STORAGE TANKS. Potable water tanks shall be so constructed, located, and protected as to prevent contamination of water stored

therein. They shall be independent and have no common partition with a tank holding nonpotable water or other liquids.

Tanks shall be constructed of impervious, corrosion-resistant and non-toxic material. They shall be so designed as to permit complete draining and flushing. If a protective coating is used, such coating shall not render the water toxic or otherwise unfit for human consumption. A current list of Potable Water Tank Linings Accepted for Interstate Carrier Use is maintained by the Interstate Carrier Branch of the Public Health Service.

4. TANK OVERFLOWS. The overflow shall terminate in a downward direction and shall be so located and constructed as to prevent entrance of contamination.

5. TANK VENTS. Overflows may serve as tank vents. If separate vents are used, they shall be so located and constructed as to prevent the entrance of contaminating substances. Vent pipes shall terminate with their open ends pointing downward.

6. WATER-LEVEL GAUGES. If a means is provided for determining the amount of water in the potable-water tank, it shall be so constructed as to prevent the entrance of contamination into the tank.

7. TREATMENT FACILITIES. Water obtained from water supplies and watering points approved by the Surgeon General of the Public Health Service, does not require additional treatment aboard conveyances. If a carrier elects to provide such treatment, it must be shown to have no detrimental effect on the quality of the water nor present a health hazard.

If filters are used, they shall be of the removable type so that they can be cleaned and sterilized or replaced with sterilized units.

8. DISTRIBUTION SYSTEM. All potable water distribution piping, tubing, and fittings shall be new and of impervious, corrosion-resistant, and nontoxic material. The potable water system shall not be cross-connected with any nonpotable system. Overflows, vents, and drains from tanks or the distribution system shall not be connected directly to waste water lines or waste retention facilities.

Water pressure may be maintained by gravity, compressed air, or electric pump. When compressed air is used, a filter shall be installed in the air supply line. Potable water pumps shall be used for no purpose other than pumping potable water.

Delivery of potable water to sinks, wash basins, dental units, and other facilities shall be through an air gap equivalent to twice the effective diameter of the inlet line but in no case less than one inch above the overflow rim of the fixture. Where an air gap is impracticable, a properly installed backflow preventer (vacuum breaker) shall be provided. A direct connection of the potable water system to a coffee-making unit is acceptable.

Distribution lines shall not pass through tanks storing nonpotable liquids.

Water coolers which are permanently installed on the aircraft shall be an integral part of the water distribution system. The cooler shall be of nontoxic, corrosion-resistant material, and so constructed as to prevent the refrigerant from coming into contact with the potable water. A dispenser for single-service drinking cups, and a receptacle for used cups, should be installed adjacent to the water cooler outlets, unless the cooler is equipped with an angle jet fountain.

9. DISINFECTION OF SYSTEM. Water supply systems on aircraft should be properly cleaned, disinfected, and flushed before being placed in service, after repairs on the systems, whenever evidence of contamination exists, and routinely during regular visits to overhaul base. The following instructions should be utilized in the disinfection of potable water systems by the use of chlorine compounds:

a. Flush the tank and distribution system with potable water.

b. Determine the volume of water necessary to fill the tanks and distribution system completely. The amount of disinfecting agent required may be determined from Table I. When the capacity of the system or the concentration of chlorine in the compound is different from those listed in the table below, the amount of disinfecting agent for 50-p.p.m. solution can be computed by:

$$\text{Dosage of powder} = \frac{70 \text{ percent}}{\text{percent chlorine in composition}} \times \text{dosage in 70-percent column}$$

$$\text{Dosage of liquid} = \frac{5 \text{ percent}}{\text{percent chlorine in liquid}} \times \text{dosage in 5-percent column}$$

TABLE I.—*Amount of chlorine compound required for a 50-p.p.m. solution*

Capacity of system		Ounces of chlorine compound required			
Gallons	Pounds	Chlorinated lime (35 percent)	High-test calcium hypochlorite (70 percent)	Liquid sodium hypochlorite	
				(5 percent)	(10 percent)
50	417	1.3	0.5	6.7	3.3
75	626	2.0	0.7	10.0	5.0
100	834	2.7	1.0	13.3	6.7
125	1,043	3.3	1.2	16.7	8.3
150	1,251	4.0	1.4	20.0	10.0
175	1,460	4.7	1.7	23.3	11.7
200	1,668	5.3	1.9	26.7	13.3
250	2,085	6.7	2.4	33.3	16.7

NOTE.—A heaping tablespoon holds approximately ½ ounce, a measuring cup approximately 8 ounces of the dry chemical.

c. Prepare the chlorine solution as follows:

(1) *Chlorinated lime.* Place the proper amount of chlorine compound in a clean, dry bucket. Add a small amount of water and mix

to a thick paste. Dilute the paste by adding water gradually and stirring constantly until the chemical goes into solution. (Warm water is better than cold water for this purpose.) Allow the solution to stand for 30 minutes, so that the undissolved particles may settle to the bottom. Pour off the clear liquid (which is the chlorine solution) and, if necessary, filter it through muslin or cheesecloth.

(2) *High-test hypochlorite.* Place the proper amount in a bucket, fill with water, and stir until the powder is dissolved (disregard slight turbidity, if any).

(3) *Liquid sodium hypochlorite.* These solutions require no additional preparation.

d. Introduce the chlorine solution into the potable water tank.

e. Immediately after introducing the chlorine solution, the tank should be completely filled with water. Sufficient mixing usually will be obtained by swirling action of the incoming water.

f. Open each tap on the distribution system and allow the water to flow until chlorinated water appears. Since a certain amount of the chlorinated water will have been drawn from the storage tank, it should be refilled to overflowing and chlorine solution should be added, if necessary, to obtain at least a 50-p.p.m. dose in the tank.

g. After the tank and the piping system have been filled, the chlorinated water should be allowed to stand in them for at least 4 hours before it is discharged. (In an emergency, the contact time may be shortened to 1 hour by increasing the dosage to 100 p.p.m.)

AIRCRAFT GALLEYS

Section A. DEFINITIONS

1. **FOOD** shall be interpreted to mean any raw, cooked or processed edible substance, beverage or ingredient, used or intended for use in whole, or in part, for human consumption.

2. **FOOD-CONTACT SURFACES** shall mean those surfaces of equipment and utensils with which food normally comes in contact, and those surfaces with which food may come in contact and drain back onto surfaces normally in contact with food.

3. **READILY ACCESSIBLE** pertains to areas or surfaces that are or can be exposed for cleaning without the use of tools.

4. **ACCESSIBLE AREA** is one that can be readily exposed for inspection and proper cleaning by the use of simple tools.

5. **READILY REMOVABLE PARTS** are those that can be disassembled or removed without the use of tools.

6. **EASILY CLEANABLE SURFACES** are those constructed of such materials, and so fabricated, as to facilitate easy and thorough cleaning with normal cleaning methods and materials.

7. CORROSION-RESISTANT MATERIAL shall mean a material which maintains its original surface characteristics under prolonged influence of the food, cleaning compounds and sanitizing solutions which may contact it.

8. NONABSORBENT MATERIAL is one whose surface is resistant to moisture penetration.

9. DURABLE MATERIAL AND CONSTRUCTION are those which are able to withstand normal abuse.

10. NONTOXIC MATERIALS are those which will not introduce poisonous, harmful or injurious ingredients or substances into the food product.

11. SEALED shall mean free of cracks or other openings which permit the entry or passage of moisture.

12. CLOSED shall mean fitted together snugly leaving no openings large enough to permit the entrance of vermin.

13. SMOOTH refers to a surface which is at least comparable to a #4 mill stainless steel finish.

Section B. MATERIALS

1. FOOD-CONTACT SURFACE MATERIALS should be corrosion resistant, nontoxic, nonabsorbent, smooth, durable and easily cleanable. Heating units in contact with food, cooking fats, oils, or similar cooking media, should comply with this item.

2. CUTTING BOARDS should be of a material equal to or better than select hard maple and comply with Item B.1 above.

3. MATERIALS other than those already accepted for use as food-contact surfaces or containers should be deemed acceptable by the Public Health Service before installation.

4. SOLDER, when used as a food-contact surface, shall be limited to joining metal or sealing seams between abutting metal surfaces; shall be of such formulation as to be nontoxic under use conditions; shall contain no more lead than is necessary under good manufacturing practice; and shall, consistent with good industrial practice in the refining of its constituent elements, be free of cadmium, antimony, bismuth, and other toxic materials.

5. WELDING MATERIALS, used in welding together noncorrosive materials, should render the weld area corrosion resistant.

6. EXPOSED NON-FOOD-CONTACT SURFACE MATERIALS should be durable and easily cleanable.

Section C. DESIGN AND CONSTRUCTION

1. FOOD-CONTACT SURFACES should be free of open seams, cracks or crevices and should be readily cleanable. Exposed bolts, nuts, threads, screw heads and rivets are not acceptable on food-contact surfaces.

2. ON COVED CORNERS of food contact surfaces, the coved radius should be at least 1/16 inch.

3. SOLDERED AND WELDED food-contact surfaces should be smooth and durable. The deposited material should be finished to eliminate sharp angles, cracks and crevices.

4. ALL COMPARTMENTS in which food or food utensils are stored on open trays should be easily cleanable and of closed construction. Interior surfaces, shelves, drawers and non-food-contact surfaces therein shall be of easily cleanable construction, and cracks, crevices or other features which create difficult to clean areas should be filled.

5. AREAS IN WHICH FOOD PRODUCTS ARE HANDLED or stored should be protected against leakage or droppage of wastes, materials or other extraneous or foreign substances.

6. EXPOSED NON-FOOD-CONTACT SURFACES should be free of open seams, cracks or crevices.

7. ALL PERMANENTLY INSTALLED AIRCRAFT GALLEYS, galley equipment and components should be constructed to exclude openings into inaccessible areas wherein food, dust, or liquids may enter and insects harbor. Openings between the outer shell of the galley and the aircraft fuselage should be effectively closed during installation. Access openings thereto should be provided with tightly fitting covers or panels.

8. PERMANENTLY INSTALLED GALLEYS AND GALLEY EQUIPMENT should be sealed to the floor or base to prevent entrance of insects, dust, food, liquid or other substances which may gain access thereunder, either from inside or outside the galley framework.

9. FABRICATION of the galley structural members should preclude inaccessible areas, openings or spaces which would make cleaning difficult. Channels with distances between legs less than 3/4 inch and depth more than 1 inch should be enclosed. The floor of the galley should be constructed as a readily cleanable surface in order to enhance the removal of spilled liquids, food fragments or other waste materials. Where structural members or other components are raised above the galley floor, sufficient clearance should be provided between the galley floor and any structural members or other components to facilitate removal of debris therefrom. Radii of at least 1/16 inch should be provided at corners formed by the intersection of the floor and the side walls, partitions or other surfaces connected thereto.

10. THE FABRICATION OF GALLEY INTERIORS, equipment panels and structural members should be accomplished with a minimum use of slotted head screws and bolts or cherry rivets.

11. DOOR CATCH OPENINGS, latches, latch striker plates and other fastening devices should not contain or provide openings into enclosed

channels, door panels or other component parts of the galley which could permit the entrance of insects and foreign substances to such members.

12. DOORS OF TRAY CARRIERS, ovens and similar portable equipment should be so fabricated and hung as to minimize the possibility of the entrance of insects and foreign substances when closed.

13. ELECTRICAL CABLES, sockets, brackets, tubing or other fixtures or fittings within the galley framework should be installed in such a manner as to prevent insect harborage and permit satisfactoy cleaning. Electrical conductors if installed within accessibe areas should be housed in conduits or enclosed chases and so located as to not to interfere with cleaning operations.

14. WHERE COUNTER-TOP DRAINS ARE NECESSARY, the drain receptacle should be constructed so that sloted covers, screens or other appurtenances are readily removable for cleaning. Garbage and waste chutes and waste drains should be installed so as to preclude contamination of food by splash, seepage, condensation or leakage.

15. CUTTING BOARDS should be readily removable and easily cleanable.

16. COVERS, inserts or receptables for unpackaged foods or beverages should be readily removable.

17. INSULATION MATERIAL should be protected from seepage and condensation.

18. BREAKER OR CLOSING STRIPS should not permit entry of food fragments, debris or seepage.

19. BASES OR CURBS used for supporting equipment above the floor level, if provided with toe space, should not be indented a distance greater than the height of the lower framing member of the equipment above the floor. Toe space should have a minimum height of 2 inches.

20. REFRIGERANT COILS. Where exposed refrigerant coils are located in food compartments they should be of a finless type and arranged in order to allow thorough cleaning. Blower or fin-type evaporators should be enclosed or shielded to protect them from spillage of food and to protect the food from condensate drip.

21. REFRIGERATED SPACES should be designed to maintain food temperature at 45° F. or below. (If refrigerated spaces are not designed to maintain proper temperature, supplementary coolants such as dry ice will be needed in order to comply with operational requirements.)

22. ALL EQUIPMENT HAVING SANITATION SIGNIFICANCE used or intended for use on an aircraft, unless shown on "List of Accepted Equipment for Interstate Carrier Use," should be reviewed and accepted by the Public Health Service.

23. A HANDWASHING PLACARD should be prominently affixed to the galley in a conspicuous location.

CATERING-POINT SANITATION

The following sanitation requirements apply to the construction, maintenance, and operation of a catering establishment:

Section A. DEFINITIONS

1. **ADULTERATED** shall mean the condition of a food (a) if it bears or contains any poisonous or deleterious substance in a quantity which may render it injurious to health; (b) if it bears or contains any added poisonous or deleterious substance for which no safe tolerance has been established by regulation, or in excess of such tolerance if one has been established; (c) if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for human consumption; (d) if it has been processed, prepared, packed, or held under insanitary conditions, whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health; (e) if it is in whole or in part the product of a diseased animal, or an animal which has died otherwise than by slaughter; or (f) if its container is composed in whole or in part of any poisonous or deleterious substance which may render the contents injurious to health.

2. **APPROVED** shall mean acceptable to the Public Health Service based on its determination as to conformance with appropriate standards and good public health practice.

3. **CLOSED** shall mean fitted together snugly leaving no openings large enough to permit the entrance of vermin.

4. **CORROSION-RESISTANT MATERIAL** shall mean a material which maintains its original surface characteristics under prolonged influence of the food, cleaning compounds and sanitizing solutions which may contact it.

5. **EASILY CLEANABLE** shall mean readily accessible and of such material and finish, and so fabricated that residue may be completely removed by normal cleaning methods.

6. **EMPLOYEE** shall mean any person working in a catering establishment who transports food or food containers, who engages in food preparation or service, or who comes in contact with any food utensils or equipment.

7. **EQUIPMENT** shall mean all stoves, ranges, hoods, meatblocks, tables, counters, refrigerators, sinks, dishwashing machines, steamtables, and similar items, other than utensils, used in the operation of a catering establishment.

8. **FOOD** shall mean any raw, cooked, or processed edible substance, beverage, or ingredient used or intended for use or for sale in whole or in part for human consumption.

9. **FOOD-CONTACT SURFACES** shall mean those surfaces of equipment and utensils with which food normally comes in contact, and those

surfaces with which food may come in contact and drain back onto surfaces normally in contact with food.

10. KITCHENWARE shall mean all multi-use utensils other than tableware used in the storage, preparation, conveying, or serving of food.

11. PERISHABLE FOOD shall mean any food of such type or in such condition as may spoil.

12. POTENTIALLY HAZARDOUS FOOD shall mean any perishable food which consists in whole or in part of milk or milk products, eggs, meat, poultry, fish, shellfish, or other ingredients capable of supporting rapid and progressive growth of infectious or toxigenic microorganisms.

13. SAFE TEMPERATURES, as applied to potentially hazardous food, shall mean temperatures of 45° F. or below, and 140° F. or above.

14. SANITIZE shall mean effective bactericidal treatment of clean surfaces of equipment and utensils by a process which has been approved by the Public Health Service as being effective in destroying microorganisms, including pathogens.

15. SEALED shall mean free of cracks or other openings which permit the entry or passage of moisture.

16. SINGLE-SERVICE ARTICLES shall mean cups, containers, lids, or closures; plates, knives, forks, spoons, stirrers, paddles; straws, place mats, napkins, doilies, wrapping material; and all similar articles which are constructed wholly or in part from paper, paperboard, molded pulp, foil, wood, plastic, synthetics, or other readily destructible materials, and which are intended by the manufacturers and generally recognized by the public as for one usage only, then to be discarded.

17. TABLEWARE shall mean all multi-use eating and drinking utensils, including flatware (knives, forks, and spoons).

18. UTENSIL shall mean any tableware and kitchenware used in the storage, preparation, conveying, or serving of food.

19. WHOLESOME shall mean in sound condition, clean, free from adulteration, and otherwise suitable for use as human food.

Section B. FOOD

1. FOOD SUPPLIES. All food shall be from sources approved or considered satisfactory by the Public Health Service, and shall be clean, wholesome, free from spoilage, free from adulteration and misbranding, and safe for human consumption. No hermetically sealed, nonacid and low-acid food which has been processed in a place other than a commercial food-processing establishment shall be used.

2. FOOD PROTECTION. All food while being stored, prepared, displayed, served, transported or sold, shall be protected from contamination. Wholesome food, if mishandled, can become contaminated from

a number of sources. Food protection measures are designed to eliminate the contamination of food from any source within the establishment, and to prevent the growth of disease-producing organisms, and the production of bacterial toxins, in the event that pathogens are present in the food. All perishable food shall be stored at such temperatures as will protect against spoilage. All potentially hazardous food shall be maintained at safe temperatures (45° F. or below, or 140° F. or above), except during necessary periods of preparation and service. Raw fruits and vegetables shall be washed before use. Stuffing, poultry, stuffed meats and poultry shall be heated, throughout to a minimum temperature of 165° F., with no interruption of the initial cooking process. Pork and pork products shall be thoroughly cooked before being served. Individual portions of food once served to the customer shall not be served again: *Provided*, That wrapped food which has not been unwrapped, which is not potentially hazardous food and which is wholesome may be re-served.

Frozen food shall be kept at such temperatures as to remain frozen, except when being thawed for preparation or use. Potentially hazardous frozen food shall be thawed at refrigerator temperatures of 45° F. or below; or under cool, potable running water (70° F. or below); or quick-thawed as part of the cooking process; or by any other method satisfactory to the Public Health Service.

Containers of food shall be stored above the floor in such a manner as to be protected from splash and other contamination and at such a height to allow easy cleaning and prevent rodent harborages.

Wet storage of packaged foods shall be prohibited. The storage of packaged food in properly drained crushed, cubed, or flaked ice will not be considered "wet" storage.

The requirements for storage and general protection against contamination, as contained in this subsection, shall apply in the transporting of all food from a catering establishment to another location for service, and all potentially hazardous food shall be kept at 45° F. or below, or 140° F. or above, during transportation.

During the transportation of food from a catering establishment, all food shall be in covered containers or completely wrapped or packaged so as to be protected from contamination.

Only those poisonous and toxic materials required to maintain the establishment in a sanitary condition, and for sanitization of equipment and utensils, shall be present in any area used in connection with catering establishments.

When not in use, poisonous and toxic materials shall be stored in cabinets which are used for no other purpose, or in a place which is outside the food-storage, food-preparation, and cleaned equipment and utensil storage rooms. Bactericides and cleaning compounds shall not

be stored in the same cabinet or area of the room with insecticides, rodenticides, or other poisonous materials.

Bactericides, cleaning compounds, or other compounds, intended for use on food-contact surfaces, shall not be used in such a manner as to leave a toxic residue on such surfaces, nor to constitute a hazard to employees or customers.

Poisonous polishing materials shall not be used on equipment or utensils, nor stored in the establishment.

Poisonous compounds, such as insecticides and rodenticides, in powdered or granular form, shall have a distinctive color so as not to be mistaken for food and shall be prominently and distinctively marked or labeled for easy identification as to contents.

Poisonous materials shall not be used in any way as to contaminate food, equipment, or utensils, nor to constitute other hazards to employees or customers.

Section C. PERSONNEL

1. HEALTH AND DISEASE CONTROL. No person while affected with any disease in a communicable form, or while a carrier of such disease, or while afflicted with boils, infected wounds, sores, or an acute respiratory infection, shall work in any area of a catering establishment in any capacity in which there is a likelihood of such person contaminating food or food-contact surfaces with pathogenic organisms, or transmitting disease to other individuals; and no person known or suspected of being affected with any such disease or condition shall be employed in such an area or capacity.

2. CLEANLINESS. All employees shall wear clean outergarments, maintain a high degree of personal cleanliness, and conform to hygienic practices while on duty. They shall wash their hands thoroughly in an approved hand-washing facility before starting work, and as often as may be necessary to remove soil and contamination. No employee shall resume work after visiting the toilet room without first washing his hands.

Employees shall not use tobacco in any form while engaged in food preparation or service, or while in equipment and utensil washing or food-preparation areas.

Section D. FOOD EQUIPMENT AND UTENSILS

1. SANITARY DESIGN, CONSTRUCTION AND INSTALLATION OF EQUIPMENT AND UTENSILS. All equipment and utensils shall be so designed and of such material and workmanship as to be smooth, easily cleanable and durable, and shall be in good repair; and the food-contact surfaces of such equipment and utensils shall, in addition, be easily accessible for cleaning, nontoxic, corrosion-resistant and relatively

nonabsorbent: *Provided*, That, when approved by the Public Health Service, exceptions may be made to the above material requirements for equipment such as cutting boards, blocks, and baker s tables.

Beverage containers used on aircraft for dispensing drinking water or beverages should be designed for easy cleaning, and should be maintained in a sanitary condition. The interiors of such containers should be smooth, with all joints tight. Valves and vents for these containers should be so constructed as to be easily cleaned.

All equipment shall be so installed and maintained as to facilitate the cleaning thereof, and of all adjacent areas.

Equipment in use at the time of adoption of these standards which does not meet fully the requirements, may be continued in use if it is in good repair, capable of being maintained in a sanitary condition and the food-contact surfaces are nontoxic.

Single-service articles shall be made from nontoxic materials.

Utensils containing or plated with cadmium, antimony, zinc, lead or other material toxic under use conditions, shall not be used. Solder, when used as a food-contact surface, shall be limited to joining metal or sealing seams between abutting metal surfaces; shall be of such formulation as to be nontoxic under use conditions; shall contain no more lead than is necessary under good manufacturing practice; and shall, consistent with good industrial practice in the refining of its constitutent elements, be free of cadmium, antimony, bismuth, and other toxic materials.

Joints and seams in equipment and between various units of equipment should be smooth, easily cleanable, and without cracks or crevices. Unnecessary ledges should be eliminated. Gaskets should be of nonabsorbent material, and kept in good repair.

All compartments with lids should be designed with a collar or breaker strip which will prevent seepage into the compartment. Recessed or flush-type handles, if used on lids, should be constructed so as to be easily cleaned, and to prevent pooling of liquids within the recess.

The minimum clearance between the floor and the undersurface of equipment should be at least 6 inches, unless these spaces are completely enclosed. Toe space under the front surface of equipment is satisfactory.

2. CLEANLINESS OF EQUIPMENT AND UTENSILS. All eating and drinking utensils shall be throughly cleaned and sanitized after each usage.

All kitchenware and food-contact surfaces of equipment, exclusive of cooking surfaces of equipment, used in the preparation or serving of food or drink, and all food-storage utensils, shall be thoroughly cleaned immediately after each food-service period. Cooking surfaces of equipment shall be cleaned at least once a day. All utensils and food-contact surfaces of equipment used in the preparation, service,

display, or storage of potentially hazardous food shall be thoroughly cleaned and sanitized prior to such use. Non-food-contact surfaces of equipment shall be cleaned at such intervals as to keep them in a clean and sanitary condition.

After cleaning and until use, all food-contact surfaces of equipment and utensils shall be so stored and handled as to be protected from contamination.

Multi-service spigots, after cleaning and bactericidal treatment, should be handled in such a manner as to avoid contamination. They should be reasembled, replaced on the container, and provided with a protective covering which should be securely fastened. After cleaning and bactericidal treatment, beverage containers should be inverted on racks which are so constructed as to permit air-drying of the containers.

All single-service articles shall be stored, handled, and dispensed in a sanitary manner, and shall be used only once.

3. SANITIZATION OF EQUIPMENT AND UTENSILS—EXISTING EQUIPMENT. Equipment which was installed in a food-service establishment prior to the effective date of this handbook, and which does not meet fully all of the design and construction requirements of this section, shall be deemed acceptable in that establishment if it is in good repair and capable of being maintained in a sanitary condition.

a. After multi-use eating and drinking utensils have been thoroughly cleaned, they should be subjected to one or more of the following procedures for proper bactericidal treatment:

(1) By immersion of the utensil or equipment for at least ½ minute in clean hot water at a temperature of at least 170° F. A three-compartment sink shall be provided. After utensils or equipment have been washed and rinsed, they should be placed in long-handled baskets and immersed in water of at least 170° F. for a period of not less than ½ minute. The treatment compartment should be provided with a thermometer, the scale divisions of which are not more than 2° F., and the accuracy of which is within 2° F;

(2) By immersion of the utensil or equipment for at least 1 minute in a lukewarm (not less than 75° F.) chlorine bath containing at least 50 parts per million of available chlorine if hypochlorites are used. A three-step operation is necessary. After utensils and equipment have been washed, they should be rinsed in clean water, then immersed for at least 1 minute in a lukewarm chlorine solution containing at least 50 parts per million of available chlorine. The solution in the treatment compartment should contain about 100 parts per million of chlorine initially and should be discarded before the strength falls below 50 parts per million. While they are not required, long-handled baskets are recommended for use in this method of bactericidal treatment;

(3) By exposure of the utensil or equipment in a steam cabinet at a temperature of at least 170° F. for at least 15 minutes or at a temperature of 200° F. for at least 5 minutes;

(4) By exposure of the utensil or equipment in an oven or hot air cabinet at a temperature of at least 180° F. for at least 20 minutes;

(5) Equipment that is too large for immersion may be treated (a) with live steam from a hose, when the steam can be confined in the equipment (b) by a boiling water rinse; or (c) by spraying or swabbing with a solution of at least 100 parts per million chlorine;

(6) Any other method determined by the Surgeon General, upon application, to be effective in the bactericidal treatment of utensils and equipment.

b. If a spray-type dishwashing machine is installed, it should be operated so that the utensils are washed clean to the sight and touch and subjected to effective bactericidal treatment.

Proper use of the dishwashing machine requires that utensils be thoroughly scraped, placed in racks so that all surfaces of the utensils can be reached by wash water and rinse sprays and drain freely. For effective cleansing of utensils, wash water should contain a suitable detergent and should be maintained at a temperature of at least 140° F. The bactericidal rinse should be maintained at or above a temperature of 180° F. (measured at the manifold). In single-tank, stationary rack, spray-type dishwashing machines, acceptable bactericidal treatment may be obtained with a rinse period of at least 10 seconds.

In connection with the use of conveyor type machines, equipment manufactured, installed and operated in conformity with Standard No. 3, Spray-Type Dishwashing Machines, prepared by the Joint Committee on Food-Equipment Standards and published by the National Sanitation Foundation, Ann Arbor, Mich., will be considered as complying with the requirements of this Manual.

An easily readable thermometer shall be provided in each tank of the dishwashing machine which will indicate to an accuracy of ± 2° F. the temperature of the water or solution therein. In addition, a thermometer of equal accuracy shall be provided which will indicate the temperature of the final rinse water as it enters the manifold.

The dishwashing equipment should be thoroughly cleaned and serviced at the end of each washing period. This should include cleaning of utensil-storage tables; cleaning of wash arms (by removing end caps when arms themselves are not removable); inspection and cleaning, if necessary, of final rinse sprays; removal and cleaning of scrap trays; draining, cleaning, and flushing of tanks and pumps; removal and cleaning of curtains; reassembly and check of machine for next operation; and cleaning and filling of detergent dispenser, if used.

Periodic checks of dishwashing machines should be made at appropriate intervals by competent personnel representing the manufacturer.

Section E. SANITARY FACILITIES AND CONTROLS

1. WATER SUPPLY. The water supply shall be adequate, of a safe, sanitary quality and shall be obtained only from a water supply which is approved by the Public Health Service.

Hot and cold running water under pressure shall be provided in all areas where food is prepared, or equipment, utensils, or containers are washed.

Ice shall be made from water which comes from an approved source, and shall be used only if it has been manufactured, stored, transported, and handled in a sanitary manner.

2. SEWAGE DISPOSAL. All sewage shall be disposed of in a public sewerage system, or, in the absence thereof, in a manner approved by the health authority and meeting the requirements of the Public Health Service.

3. PLUMBING. Plumbing shall be so sized, installed, and maintained as to carry adequate quantities of water to required locations throughout the establishment; as to prevent contamination of the water supply; as to properly convey sewage and liquid wastes from the establishment to the sewerage or sewage-disposal system; and so that it does not constitute a source of contamination of food, equipment, or utensils, or create an insanitary condition or nuisance.

Dishwashing machines, refrigerators, steam kettles, potato peelers, and similar types of enclosed equipment in which food, portable equipment, or utensils are placed, shall not be directly connected to the drainage system. Each waste pipe from such equipment shall discharge into an open, accessible, individual waste sink, floor drain, or other suitable fixture which is properly trapped and vented: *Provided*, That when a dishwashing machine is located adjacent to a floor drain, the waste from the dishwashing machine may be connected directly on the sewer side of the floor drain trap. Indirect connections of drain lines from other equipment used in the preparation of food or washing of equipment and utensils may be required when the installation is such that backflow of sewage is likely to occur. Each walk-in refrigerator shall be equipped with a floor drain, so installed as to preclude the backflow of sewage into the refrigerator; or all parts of the floor of each walk-in refrigerator shall be graded to drain to the outside through a wastepipe, doorway, or other opening.

Indirect waste connections shall be provided for drains, overflows, or relief vents from the water-supply system.

Drain lines from equipment shall not discharge waste water in such a manner as will permit the flooding of floors or the flowing of water

across working or walking areas, or into difficult-to-clean areas, or otherwise create a nuisance.

4. TOILET FACILITIES. Each catering establishment shall be provided with adequate, conveniently located toilet facilities for its employees. Toilet fixtures shall be of sanitary design and readily cleanable. Toilet facilities, including rooms and fixtures, shall be kept in a clean condition and in good repair. The doors of all toilet rooms shall be self-closing. Toilet tissue shall be provided. Easily cleanable receptacles shall be provided for waste materials, and such receptacles in toilet rooms for women shall be covered.

5. HAND-WASHING FACILITIES. Each catering establishment shall be provided with adequate, conveniently located hand-washing facilities for its employees, including a lavatory or lavatories equipped with hot and cold or tempered running water, hand-cleansing soap or detergent, and approved sanitary towels or other approved hand-drying devices. Such facilities shall be kept clean and in good repair.

6. GARBAGE AND RUBBISH DISPOSAL. All garbage and rubbish containing food wastes shall, prior to disposal, be kept in leakproof, nonabsorbent containers which shall be kept covered with tight-fitting lids when filled or stored, or not in continuous use: *Provided*, That such containers need not be covered when stored in a special vermin-proofed room or enclosure, or in a food-waste refrigerator. All other rubbish shall be stored in containers, rooms, or areas in an approved manner. The rooms, enclosures, areas, and containers used shall be adequate for the storage of all food waste and rubbish accumulating on the premises. Adequate cleaning facilities shall be provided, and each container, room, or area shall be thoroughly cleaned after the emptying or removal of garbage and rubbish. Food-waste grinders, if used, shall be installed in compliance with State and local standards and shall be of suitable construction. All garbage and rubbish shall be disposed of with sufficient frequency and in such a manner as to prevent a nuisance.

7. VERMIN CONTROL. Effective measures shall be taken to protect against the entrance into the establishment and the breeding or presence of vermin on the premises.

Unless flies and other flying insects are absent from the immediate vicinity of the establishment, all openings to the outer air shall be effectively protected against the entrance of such insects by self-closing doors, closed windows, screening, controlled air currents, or other effective means.

Screening material shall be not less than 16-mesh to the inch or equivalent.

Screen doors to the outer air shall be self-closing; and screens for windows, doors, skylights, transoms, and other openings to the outer air shall be tight fitting and free of breaks.

All openings to the outside shall be effectively protected against the entrance of rodents.

Section F. OTHER FACILITIES AND OPERATIONS

1. FLOORS, WALLS, AND CEILING. The floor surfaces in kitchens, in all other rooms and areas in which food is stored or prepared and in which utensils are washed, and in walk-in refrigerators, dressing or locker rooms, and toilet rooms, shall be of smooth, nonabsorbent materials, and so constructed as to be easily cleanable: *Provided*, That the floors of nonrefrigerated, dry-food-storage areas need not be nonabsorbent. All floors shall be kept clean and in good repair. Floor drains shall be provided in all rooms where floors are subjected to flooding-type cleaning or where normal operations release or discharge water or other liquid waste on the floor.

The walls and ceilings of all rooms shall be kept clean and in good repair. All walls of rooms or areas in which food is prepared, or utensils or hands are washed, shall be easily cleanable, smooth, and light colored, and shall have washable surfaces up to the highest level reached by splash or spray.

2. LIGHTING. All areas in which food is prepared or stored or utensils are washed, hand-washing areas, dressing or locker rooms, toilet rooms, and garbage and rubbish storage areas shall be well lighted. During all cleanup activities, adequate light shall be provided in the area being cleaned, and upon or around equipment being cleaned.

At least 20 foot-candles of light shall be required on all working surfaces and at least 10 foot-candles on all other surfaces and equipment, in food preparation, utensil-washing and hand-washing areas.

3. VENTILATION. All rooms in which food is prepared or utensils are washed, dressing or locker rooms, toilet rooms, and garbage and rubbish storage areas shall be well ventilated. Ventilation hoods and devices shall be designed to prevent grease or condensate from dripping into food or onto food-preparation surfaces. Filters, where used, shall be readily removable for cleaning or replacement. Ventilation systems shall compy with applicable State and local fire prevention requirements and shall, when vented to the outside air, discharge in such manner as not to create a nuisance.

4. DRESSING ROOMS AND LOCKERS. Adequate facilities shall be provided for the orderly storage of employees' clothing and personal belongings. Where employees routinely change clothes within the establishment, one or more dressing rooms or designated areas shall be provided for this purpose. Such designated areas shall be located outside of the food-preparation, storage, and serving areas, and the utensil-washing and storage areas: *Provided*, That, when approved by the health authority, such an area may be located in a storage room where only completely packaged food is stored. Designated

areas shall be equipped with adequate lockers, and lockers or other suitable facilities shall be provided in dressing rooms. Dressing rooms and lockers shall be kept clean.

5. HOUSEKEEPING. All parts of the establishment and its premises shall be kept neat, clean, and free of litter and rubbish. Cleaning operations shall be conducted in such a manner as to minimize contamination of food and food-contact surfaces. None of the operations connected with a catering establishment shall be conducted in any room used as living or sleeping quarters. Soiled linens, coats, and aprons shall be kept in suitable containers until removed for laundering. No live birds or animals shall be allowed in any area used for the conduct of catering establishment operations.

AIRCRAFT SANITATION

1. FOOD AND BEVERAGE SERVICE. In-flight food service is limited, usually, to the placing of previously prepared portions of food on individual serving trays and the distribution of the trays to the passengers. In some instances, precooked frozen food is reheated aboard the aircraft for in-flight service. All operations connected with in-flight food service should be performed in such a manner as to minimize the possibility of contaminating the food.

Food-preparation surfaces, food-storage shelves, cabinets, drawers, and other food-storage surfaces aboard aircraft should be constructed of easily cleanable, noncorrodible material, and should be free of cracks, crevices, and other recesses which could make cleaning difficult. Buffet equipment should be so installed that openings to spaces between this equipment and the fuselage either are readily accessible for cleaning or are sealed to prevent insect infestation and the accumulation of dirt. All food-preparation surfaces and storage spaces for food and utensils should be kept clean and free from dust, dirt, insects, and other sources of contamination. Clean, dry, dustproof storage facilities should be provided for single-service containers and utensils.

Stewards and stewardesses should wash their hands thoroughly before beginning food-service operations, and also after every activity in which the hands may have become exposed to contamination during the period food is served. In the event that wash water is not available, a suitable germicidal solution should be used. Manual contact with food or drink should be avoided insofar as possible.

Potentially hazardous foods, while in storage on the aircraft, either should be refrigerated at or below 45° F. or should be kept at or above 140° F. (However, foods need not meet these temperature requirements for a 2-hour period immediately prior to service.)

All multi-use eating and drinking utensils used in in-flight food or beverage service should be thoroughly cleaned and subjected to effec-

tive bactericidal treatment before being used again. (Because of space and weight limitations, water requirements, and waste retention, bactericidal treatment aboard aircraft is not advisable at this time. With cleaning and batericidal treatment of multi-use eating and drinking utensils necessarily performed at ground installations, such utensils should be provided on the aircraft in sufficient number to obviate reuse during the period of flight.)

Cleaning and bactericidal treatment should be effected in accordance with the standards set forth under Sanitization of Equipment.

2. ICE. All ice which comes into contact with food or drink should come from sources approved by health authorities, and should be kept free from contamination while in storage and when being handled. Ice should be delivered to the aircraft in a covered container and, unless special storage facilities are provided on the aircraft, should remain in the container until used. Ice should be handled only with a scoop or tongs, both aboard the aircraft and in the commissary. Ice containers should be cleaned and given bactericidal treatment before being reused.

3. REFUSE HANDLING. Unconsumed food and beverages, together with the soiled utensils, may remain on the food-service trays. Soiled trays should be stored in the closed carrying cases. These food carriers may then be returned to the ground kitchen facilities by the same vehicle which transports outgoing meals to the aircraft.

Liquid and paper wastes from the galley should be removed from the aircraft and stored in covered containers. Storage of liquid wastes on the aircraft should be in watertight, nonabsorbent receptacles. Pending removal from the aircraft and disposal, soiled air-sickness containers should be properly enclosed and stored in an upright position, apart from the galley area. Air-sickness containers should be of watertight, nonabsorbent material. Personnel engaged in food or drinking-water service should wash their hands after handling used air-sickness containers.

Garbage should be removed from the aircraft only at airports where adequate facilities are available for its storage and disposal, and should not be carried in the same vehicle in which food service equipment is transported. Garbage containers, if reusable, should be thoroughly cleaned before being returned to the aircraft.

CONTROL OF DRINKING WATER

1. WATER-PIPING SYSTEM. The water-piping system in the servicing area should be of such a size that an adequate positive pressure can be maintained throughout the system at all times; furthermore, due regard should be given to unusual usage from any part of the system. There should be no cross-connections between the potable-water system

and a system of questionable quality. No plumbing of any type should be installed which would permit backflow of contaminated [illegible] liquids into the potable-water system. All drinking and culinary water used in connection with the operation of air conveyances in interstate traffic should come from sources approved by the Public Health Service.

2. AIRCRAFT WATER SYSTEM. All aircraft water systems which supply water for public use should provide potable water only, and should be closed from the filling inlet to the discharge outlets (except that vent openings are permitted wherever necessary, if properly protected to prevent contamination of the water supply).

Preferably, drinking water should be obtained from a fixed system on board the aircraft. However, this does not imply that properly constructed and properly maintained beverage containers are unsatisfactory.

Water, to be considered potable, should originate from a source approved by the Public Health Service, and should be loaded into the plane in a manner which will not permit the water to be contaminated in handling. A direct hose connection from the supply hydrant to the aircraft is preferable. The tanks and water system should have no sanitation defects.

3. HYDRANTS. Hydrants (including taps and faucets) from which water for drinking or culinary purposes is supplied for use on aircraft, should be designed, located, installed, and maintained so as to assure protection of the water against contamination. Such hydrants should not be located in toilet rooms, washrooms, or other places where danger of contamination exists or may develop. Post-type or wall-type hydrants are preferred, but ground-level-type hydrants are acceptable when necessary. Potable water for use on aircraft should be supplied from hydrants which are used for no purpose which could adversely affect the quality of the water.

Where hoses are used for loading potable water on aircraft, the hydrant outlet should have a type of coupling which will permit quick attachment and removal of the hose. For a hose permanently attached to the hydrant outlet, a threaded fitting will be acceptable.

Outlets to all hydrants should terminate in a downward direction or gooseneck, except that ground level type hydrants may discharge horizontally.

When the hydrant is of the ground level type, or is located in a pit, precautions should be taken in the construction of the watering point to assure adequate drainage from the hydrant area and from the hydrant box. In new servicing areas, hydrants with weep holes will not be accepted.

4. WATER HOSE. Hoses used to deliver potable water to air conveyances should be of satisfactory material, and should be handled

properly and used for no other purpose. They should have smooth interior surfaces, should be free of cracks and checking, and should be sufficiently durable to withstand hard usage. The nozzle on the end of the hose should be so constructed as to permit a tight connection with the filling connection of the aircraft, and should be of a different size from that of any waste connections on the aircraft. The potable water hose filling connection shall not exceed ¾-inch in diameter, and the waste tank flushing hose connection shall be no less than 1-inch in diameter. All hose connections should be of the quick-coupling type, unless the hose is permanently attached to a water cart or hydrant.

Neither the nozzle nor the hydrant end should be permitted to touch the ground or any contaminating materials, such as pools of water on the ground. Guards, disks, or other devices which will protect the nozzle end of the hose from contamination, should be provided and properly maintained. Disks which are used as protective devices should be at least 6 inches in diameter, and should be located not over 8 inches from the hose end. Valves at the filling end of such a hose should not be located on the nozzle side of the disk or protective device.

The hose should be stored on special reels, or in lockers or cabinets which are used for no other purpose, unless the hose ends are protected from contamination by suitable caps when not attached to conveyances, water carts, or hydrants.

The hose should be flushed thoroughly before being used.

5. WATER TANKS AND TANK CARTS. Portable water tanks which are used to transport water for drinking and culinary use on aircraft should be properly constructed, operated, and stored, and should be used for no purpose which could adversely affect the quality of the water (e.g., for garbage or sewage).

These tanks should be constructed of smooth, heavy-gauge, corrosion-resistant material, and should be completely enclosed from filling inlet to discharge outlet, except that vent openings are permitted whenever necessary, if protected to prevent contamination of the water.

The tanks should be so designed that they can be steamed and flushed, and should be provided with a drain that permits complete drainage of the tank. They should be labeled DRINKING WATER ONLY.

The inlet and outlet to the tank should terminate in a downward direction or gooseneck, and should be provided with caps or closures with keeper chains for protection against contamination. The inlet and outlet should be equipped with couplings of a type which permits quick, easy attachment and removal of the hose. Threaded fittings on inlets and outlets to water tanks will be acceptable only with hoses which are permanently attached.

When hoses are transported on the water cart, storage facilities should be provided on the cart to protect the hoses from contamination.

Transferral of water to the water-storage facilities on the aircraft should be accomplished so as to prevent contamination.

HANDLING AND DISPOSAL OF WASTES FROM AIRCRAFT

No excrement should be discharged or removed from any aircraft, except at airports which have adequate soil-waste servicing facilities.

1. AIRCRAFT TOILET FACILITIES. Toilet facilities on the aircraft should be so designed as to prevent accumulation of fecal matter on the sides of the bowl. All interior corners in the facility should be rounded with not less than ¼-inch radius, and all seams and joints should be smooth. Soil cans or retention tanks should be of sufficient capacity to retain all waste discharge in a sanitary manner.

a. When toilet wastes are retained in removable soil cans, provision should be made to fix the soil can in place under the toilet so as to prevent excrement from falling outside of the removable container.

b. When toilet wastes are stored in retention tanks which are permanently installed on the aircraft, the discharge from the retention tank should be so designed that the contents of the tank cannot be discharged when the aircraft is in flight.

Discharge-control devices on the retention-tank outlet should be so designed as to prevent leakage and, when the tank is being discharged, to prevent spattering of the servicing area or servicing-area personnel.

Provision should be made for the retention tank and toilet hopper to be thoroughly flushed during the servicing operation.

Lavatory facilities should be permanent installations, and of durable, easily cleanable construction. Water inlets to each basin should terminate at least 1-inch above the flood level or the overflow rim of the fixture. Facilities should include an easily cleanable basin, a dispenser for soap (with an adequate supply of soap), a clean-towel dispenser (with towels), a soiled-towel receptacle, and piped warm (or hot and cold) water.

2. HANDLING OF TOILET WASTES. Proper facilities should be provided for handling toilet wastes from aircraft. Facilities required will depend to a great extent, of course, on the type of toilet being serviced. Personnel engaged in the removal or disposal of wastes should not be permitted to handle food or drinking water, or equipment used for placing them aboard the aircraft.

a. Removable Soil Cans.—When the soil can is removed from the aircraft, the contents should be enclosed or covered while being transported to the facilities for emptying and cleaning the cans.

b. Fixed Waste-Retention Tanks.—When tanks are permanently installed on aircraft to retain toilet wastes, the following provisions should be made for handling the wastes:

(1) The sewage accumulated in the retention tank on the aircraft should be discharged, through a flexible hose with a watertight connection, either directly to a sewer or to a portable, watertight tank, in order to avoid contamination of the area.

Facilities should be available for flushing the retention tank. (Direct connections to the water-distribution system should never be used for this purpose.) Wastes resulting from the flush operation should be discharged to the sewer or receiving tank. After flushing, cleaning, and deodorizing the toilet hopper and retention tank, some odor-destroying substance may be left in the retention tank, but a deodorant should not be used in lieu of proper cleaning.

(2) Conveyances for waste-receiving tanks, toilet-flushing water, or deodorants, should be maintained separately from drinking-water and food-service equipment. All hose connections for servicing aircraft waste-disposal facilities should be of a different size or type than those used for supplying potable water to the aircraft and should be no less than 1-inch in diameter. Tanks should be labeled clearly, and usage should be restricted accordingly.

3. DISPOSAL OF TOILET WASTES. The following requirements apply to all ground facilities and operations for waste disposal and the cleaning of soil cans and soil-waste conveyor tanks.

In all installations, ground facilities for disposing of wastes from soil cans or waste-conveyor tanks, or for the washing of such equipment, should be situated away from any food-service or drinking-water-servicing operation.

a. Minimum facilities for disposing of wastes from soil cans or waste-conveyor tanks and for cleaning soil cans should include:

(1) A manhole or hopper, connected to a sanitary sewer or other approved waste-disposal facility, for the disposal of the contents.

(2) An impervious floor, graded to drain, surrounding the manhole or hopper.

(3) Water under pressure and a hose with a nozzle, or other suitable washing facilities. The waterline pressure should be at least 20 pounds per square inch. Either hot water or steam should be available for removing contents adhering to the inside or outside of cans.

Facilities for washing soil cans and waste-conveyor tanks should be so designed as to prevent any possibility of backflow into the water-supply system. The water-supply lines to these facilities should be provided with suitable vacuum breakers. The vacuum breakers should be situated on the discharge side of the last control valve, at least 6 inches above the highest point which the top of the soil can or waste-conveyor tank will reach when in washing position. When a hopper-

Removing toilet wastes from aircraft.

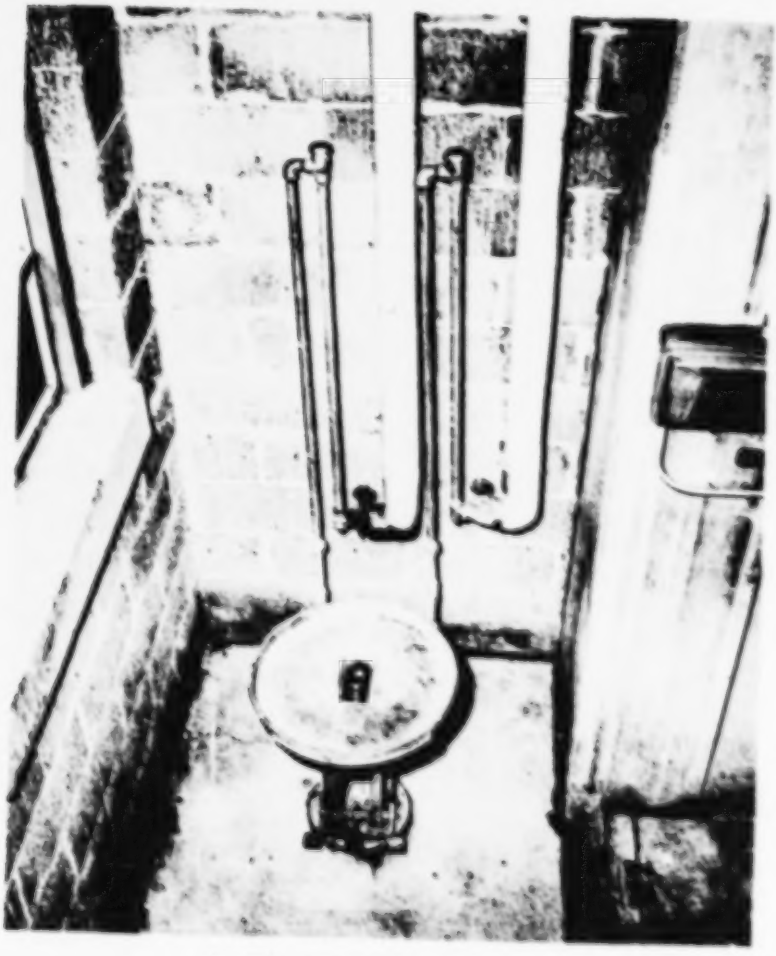
type washer is used, the vacuum breaker should be at least 4 inches (or as specified for the model) above the overflow rim of the hopper.

b. Soil cans should be emptied, and should be washed inside and outside immediately after removal from the aircraft. When not in use, clean cans should be stored on a special rack or in a locker. Clean soil cans which are stored outside of the can-washing room should be kept in enclosed storage, separate from food-service or water-service equipment.

4. HANDLING OF AIRCRAFT REFUSE. Multi-service liquid-waste receptacles which are used in aircraft galleys should be removed from

the aircraft in a manner which will preclude spillage in the servicing areas. Contents of the receptacles should be emptied into storage containers provided for that purpose. Storage containers located in the servicing area or in the hangar area should be emptied, with the contents properly dispatched, frequently enough to prevent nuisance or unsightliness.

Refuse storage and refuse collection containers should be covered at all times, except when contents are being transferred. The design, maintenance, and handling of refuse receptacles should comply with



Facilities for washing garbage cans.
(Note location of vacuum breakers on supply lines.)

requirements set forth in section E of Catering-Point Sanitation. The receptacles should be cleaned and stored in a sanitary manner. Receptacles used in aircraft galleys should not be cleaned at soil-can cleaning installations, nor should they be stored in the same room with soil cans.

Used air-sickness containers and rubbish should be removed from the aircraft and disposed of in a sanitary manner. Used air-sickness containers should be handled with care. The contents may be emptied into a sewer or other facility approved by a competent health authority. The container may then be disposed of with other rubbish in the prescribed manner. Where adequate incineration facilities are available, it is recommended that used air-sickness containers be incinerated.

MISCELLANEOUS

1. DISPOSAL OF REFUSE. Refuse-disposal practices vary considerably thoroughout the country. Where municipal refuse collection and disposal services are available, they will be considered adequate, provided that such collection is conducted in such a manner as to prevent nuisance or unsightliness in refuse-storage areas.

When refuse must be disposed of by the carrier, adequate disposal facilities should be provided. The use of properly operated incinerators or sanitary landfills is recommended. Plans for the construction of such facilities, showing the proposed location, should be submitted to the Public Health Service, as set forth in the section on Construction Plans.

2. SANITATION FACILITIES FOR EMPLOYEES. Toilets, locker rooms, and washrooms for servicing-area personnel should be provided at convenient locations. Such facilities should be kept clean and in good repair. Toilet paper should be available in suitable dispensers. Handwashing facilities should be located in or adjacent to toilet rooms, and should include an easily cleanable basin, a dispenser with an adequate supply of soap, a clean-towel dispenser with towels, a soiled-towel receptacle, and piped warm (or hot and cold) water. A warm-air jet, in lieu of towels, will be considered satisfactory, if properly installed and operated so as to assure prompt and adequate hand-drying. Signs instructing employees to wash their hands before resuming work should be posted in toilet rooms. Toilets on aircraft should not be used by servicing personnel while the aircraft is in a servicing area.

Drinking water, if provided for servicing-area personnel, should be of safe quality and should be dispensed in a sanitary manner. Cups, glasses, or other drinking utensils which may be used by more than one person should not be provided.

Drinking fountains, when provided, should be of satisfactory design and type The nozzle of the fountain should be of non-oxidizing

material, and should be set at an angle to prevent water in the jet from falling back into the orifice. The nozzle orifice, and all other openings into the fountain's water supply, should be located sufficiently above the overflow rim of the fountain bowl so that such orifice or openings cannot become submerged if the drain from the fountain bowl should become clogged.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

REGIONAL OFFICES

REGION I—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
120 Boylston Street
Boston, Mass. 02116

REGION II—Delaware, New Jersey, New York, Pennsylvania
Room 1200, 42 Broadway
New York, N.Y. 10004

REGION III—District of Columbia, Kentucky, Maryland, North Carolina, Virginia, West Virginia, Puerto Rico, Virgin Islands
700 East Jefferson Street
Charlotteville, Va. 22901

REGION IV—Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee
Room 404, 50 Seventh Street NE.
Atlanta, Ga. 30323

REGION V—Illinois, Indiana, Michigan, Ohio, Wisconsin
Room 712, New Post Office Building
433 West Van Buren Street
Chicago, Ill. 60607

REGION VI—Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
560 Westport Road
Kansas City, Mo. 64111

REGION VII—Arkansas, Louisiana, New Mexico, Oklahoma, Texas
Ninth Floor, 1114 Commerce Street
Dallas, Tex. 75222

REGION VIII—Colorado, Idaho, Montana, Utah, Wyoming
Equitable Building
730-17th Street
Denver, Colo. 80202

REGION IX—Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, Guam, American Samoa
447 Federal Office Building
Civic Center
San Francisco, Calif. 94102